

than the present. The Perkin jubilee has been the means of arousing a certain amount of interest as to the cause of lost industries, and the remedies to be applied if we are to secure industrial progress in the future. Enlightened manufacturers are prepared to give substantial support to an institution which will aim at bringing scientific knowledge in close relation with industries and industrial needs. Not to take advantage of the present desire for action would be dilatory policy; and if the scheme is held up while discussion takes place upon its academic aims and relationships, nothing could be more disappointing to those who are anxious to see the establishment of an institute capable of rendering great service to the community.

In the proposed new college no provision is to be made for biological subjects; and Prof. Ray Lankester has written a letter to Lord Rayleigh, president of the Royal Society, pleading for the recognition of the fact that the needs and the importance of these sciences are as great or greater, and that they are at present well-nigh destitute of any endowment, or of adequate provision at the public charge of laboratories and the means of research. Prof. Lankester shows that there are many branches of applied biology of importance to the State, and though he does not propose any formal action to the council of the Royal Society he trusts "that means may be devised of obtaining an assurance from the Government of not merely continued, but increased, provision for the highest work and training in the various sciences of the biological group—including geology."

PROF. SAMUEL PIERPONT LANGLEY.

AT the zenith of his reputation, and possessed of his full capacity for work, America and science have to regret the death of Prof. Langley, who for nearly twenty years directed and controlled the energies of the Smithsonian Institution. The objects promoted by such an establishment are so varied, the interests that it has to maintain are so numerous, that its direction can only be confidently entrusted to one who combines the skill of the administrator with the training of the man of science. The energy displayed by Prof. Langley in the conduct of the Smithsonian Institution, and its steadily increasing influence under his direction, show that he loyally appreciated the intentions of the founder, and that he proved himself a worthy successor to Joseph Henry and Spencer Baird, names still warmly treasured in the memory of the American nation. We may recall, though we cannot do justice to, some of the more important features that have marked his connection with the institution. His supervision of the museum, and his earnest endeavour to make it more valuable for instructed and uninstructed alike, led to rearrangement, and especially to the foundation of the children's room, a feature which may serve as a model for similar institutions. The Bureau of American Ethnology is a national undertaking that has long been conducted on spacious lines, but under the late director this department has assumed magnificent proportions, the care of which was an enormous responsibility that even the assistance of able colleagues could not wholly remove. The publications of this bureau show only the thoroughly digested scientific conclusions, and represent but a fragment of the immense amount of work actually accomplished. But, perhaps, in the establishment and management of the zoological park we see the personal influence of the director most conspicuously exhibited. It was his dream to establish a park in

which the wild animals of his native land might live as nearly as possible under conditions natural to them, so that they might breed and thrive in captivity as in their native haunts. The difficulties in the way might well have daunted one less enthusiastic. More than once the question of abolishing the park has been considered, and over and over again he had to fight the battle in the teeth of hostile or indifferent politicians, who could not be made to appreciate the value of the scheme, or to recognise that the preservation of the native animals, threatened with extinction, was a trust committed to their charge. He lived to see this scheme placed on a permanent footing, and if on a more modest scale than he could have wished, he could feel that his insistence had not only preserved the nation's heritage of wild animals, but had opened up important regions of biological research and of zoological art.

But, notwithstanding the severe demands the care of such an establishment must make, Prof. Langley did not allow his activity to be wholly absorbed in the interests of the Institution. He never forgot that he was a physicist and an astronomer before he became an administrator. As a physicist, the problem of flight largely engaged his attention, a subject to the consideration of which he was led by his studies on the internal force of the wind. To what extent his experiments advanced the problem of aviation it would be premature to pronounce. The form of *aërodrome* which he favoured was capable of making flights of a mile, unsupported except by the mechanical effects of steam engines. But these successful flights were carried out on models. The application of the same principle to larger machines was, as he contended, never fairly tried. The launching apparatus was ineffective, and his machine never got into the air at all. But if its capacity for sustained flight was never tested, some of the mechanical features that he tried and adopted will no doubt find their place in later constructions. As an astronomer he will be remembered for his direction of the Allegheny Observatory and the important work which he accomplished there on the sun and in the department of spectroscopy. His drawings of the solar surface, made nearly forty years ago, remain unsurpassed for delicacy and truthfulness, while his views on the physical constitution of the sun are worthy of the closest attention. As an experienced observer of solar eclipses he was also well known, and thirty-five years ago, when the spectroscopic examination of the sun's surroundings had made but little advance, he rendered yeoman service. The invention of the bolometer constitutes a distinct claim on our gratitude. This sensitive instrument affords the means of measuring minute changes in heat arising from the change in the electrical resistance of an extremely thin strip of metal. By its use Prof. Langley showed that the corrections for atmospheric absorption, deduced by earlier observers with less perfect instruments, are all too small, and consequently the generally received value of the "solar constant" has been considerably increased. With the same instrument our knowledge of the infrared spectrum has been greatly increased. The heating effects from rays unsuspected in previous investigations have doubled the known extent of the solar spectrum. By the aid of rock-salt lenses and prisms Prof. Langley was able to show that bands of atmospheric absorption were found to alternate with bands of solar radiation, a fact of no inconsiderable importance in terrestrial meteorology.

As a writer the late director of the Smithsonian Institution was well known for his powers of graphic description and vivacious style. His "New Astronomy," published many years ago, attracted very

considerable attention, and did much to popularise the science in America. It is needless to say that he was a member of many learned societies, American and European; it will be sufficient to refer here to the fact that he was elected a foreign member of the Royal Society in 1895. At the age of seventy-two he is removed from that position he was so well fitted to adorn, and the respectful sympathy of the men of science of all nations will be offered to those who suffer by his loss.

W. E. P.

NOTES.

ONE good purpose served by the movement referred to last week (p. 419) to commemorate the jubilee of the discovery of the first artificial coal-tar colour by Dr. Perkin is that public attention has been directed to the relations between scientific research and industrial progress. The complete lack of sympathy between the capitalist in this country and the scientific worker, largely due to the indifference shown by statesmen to scientific studies, has been persistently deplored in these columns for many years; and we are glad that the general public is now being enlightened as to the results of neglect of scientific research. The coal-tar industries, founded upon an essentially British discovery, have been lost to us, and are now represented in Germany by two industrial groups which, with a capital of 50,000,000*l.*, can pay dividends of from 20 per cent. to 30 per cent. per annum. Prof. S. P. Thompson, in a letter to Saturday's *Times*, refers to this lost industry, and shows that the electrical industry and the manufacture of steel must pass to other countries unless our manufacturers realise the industrial value of higher technical education and scientific research. "Pioneering," he remarks, "as it is understood in an electrical factory in the United States or in Germany, is now almost non-existent in England; and the result on the electrical industry in the next ten years must be simply disastrous. Where are the newer kinds of electric lamps being developed? The Nernst lamp, the flame lamp, the vapour lamp, the oxide lamp, the osmium lamp, the tantalum lamp, all rich in future possibilities, where are they being perfected? Not in England. I doubt if there is a single British firm that is spending on such development a tenth part of the sum that one single American firm is spending on this one thing alone. If we cease to pioneer we become mere followers at a distance of those who are going forward—ourselves cease to lead in the development of the industry." To save our country from future disaster, our commercial and educational leaders, and our statesmen, must realise the vital nature of scientific research to national prosperity, and act upon this conviction by making adequate provision for it.

THE town council of Hamburg has voted the sum of 586,000 marks (29,300*l.*) for the construction of a new observatory at Bergedorf, about ten miles from Hamburg, and 309,000 marks (15,450*l.*) for the instrumental and electrical equipment of the observatory.

PROF. W. OSLER, F.R.S., has been elected a member of the Athenæum Club under the provisions of the rule which empowers the annual election by the committee of nine persons "of distinguished eminence in science, literature, the arts, or for public services."

THE American Geographical Society has awarded Captain R. F. Scott its gold medal in recognition of his services as commander of the British Antarctic Expedition. The Paris Geographical Society has awarded one of its gold

medals to Major C. H. D. Ryder in recognition of his work as surveyor and explorer in connection with the recent Tibet mission, and his expedition to the sources of the Brahmaputra.

THE Berlin correspondent of the *Times* states that on Monday the German Emperor formally opened the new Museum for Marine Science, Berlin University. Among those present at the opening ceremony were the Prince of Monaco, the Rector of the University, Geheimrath Diel, and many distinguished representatives of natural science. The institute, which owes its existence to the direct initiative of the German Emperor, is intended to promote and encourage the interest of the German people in marine matters, and to place the subject upon a scientific basis.

THE Empress Frederick Institute for the higher scientific and practical education of medical men, which owes its inception to a project initiated by the late Empress Frederick, was opened in Berlin on March 1. The German Emperor and Empress, accompanied by many members of the Prussian Royal Family, were present. Sir Felix Semon attended the ceremony in accordance with the commands of King Edward, and in the course of a short address referred to the King's personal interest in the new institution.

A ROYAL COMMISSION has been appointed to inquire into the canals and inland navigations of the United Kingdom, and to report on their present condition, financial position, the facilities, improvements, and extensions required to complete a system of through communication by water, the expediency of canals being made or acquired by public bodies, and other matters related to these subjects.

SIR EDWARD FRY will preside at the twenty-third annual congress of the Royal Sanitary Institute, which will be held at Bristol from July 9 to 14. The presidents of the various sections will be:—Section i., sanitary science and preventive medicine, Sir William J. Collins, M.P.; section ii., engineering and architecture, Mr. Edwin T. Hall; section iii., physics, chemistry, and biology, Dr. W. N. Shaw, F.R.S.

AT the third International Seismological Conference, held at Berlin on August 15, 1905, Signor Luigi Palazzo was elected vice-president of the permanent board of the International Seismological Association. As Prof. A. Schuster was unable to accept the presidency offered him, the assembly deputed Signor Palazzo to act as president until the new elections take place next summer. Signor Palazzo desires it to be known that the Italian Government has consented to his acceptance of the office and responsibility, and he asks for the support of all who take an interest in the progress of seismology.

DR. C. W. ANDREWS, of the British Museum, left England last week to resume the quest for the remains of extinct vertebrates from the Tertiary deposits of the Fayum and other parts of Egypt. Recent discoveries in Egypt have demonstrated the descent of the Eocene zeuglodonts from creodont Carnivora, and it is one of the objects of the present expedition to endeavour to discover, in higher beds, the missing links between zeuglodonts and true cetaceans. It may be added that the present expedition (like the earlier ones) of Dr. Andrews has been rendered practicable by the generosity of Mr. W. E. de Winton.

Science reports that, according to a despatch to the daily papers from Washington, the Carnegie Institution has purchased a tract of six acres in the north-west section of Washington, near Rock Creek Park, where it will erect a permanent home. The site is near the building of the